

Output tables for 1xN statistical comparisons.

December 17, 2022

1 Average rankings of Quade test

Average ranks obtained by each method in the Quade test.

Algorithm	Ranking
MEABC	6.0874
ABCADE	4.131
ABCNG	4.9057
SHADE	3.6966
MAPSO	4.8322
TAPSO	2.9241
MEEABC	1.423

Table 1: Average Rankings of the algorithms (Quade)

Quade statistic (distributed according to F-distribution with 6 and 168 degrees of freedom): 16.82152.  
P-value computed by Quade Test: 0.

## 2 Post hoc comparison (Quade)

P-values obtained in by applying post hoc methods over the results of Quade procedure.

$i$	algorithm	$z = (R_0 - R_i)/SE$	$p$	Holm	Hochberg	Hommel	Holland	Rom
6	ME/ABC	4.145654	0.00034			0.008333	0.008512	0.008764
5	ABCNG	3.095449	0.001965			0.01	0.010206	0.010515
4	MAPSO	3.030066	0.002445			0.0125	0.012741	0.013109
3	ABCADE	2.40689	0.016089			0.016667	0.016952	0.016667
2	SHADE	2.020725	0.043308			0.025	0.025321	0.025
1	TAPSO	1.33421	0.182135			0.05	0.05	0.05

Table 2: Post Hoc comparison Table for  $\alpha = 0.05$  (Quade)

Bonferroni-Dunn's procedure rejects those hypotheses that have an unadjusted p-value  $\leq 0.008333$ .  
Holm's procedure rejects those hypotheses that have an unadjusted p-value  $\leq 0.025$ .  
Hochberg's procedure rejects those hypotheses that have an unadjusted p-value  $\leq 0.016667$ .  
Hommel's procedure rejects those hypotheses that have an unadjusted p-value  $\leq 0.025$ .  
Holland's procedure rejects those hypotheses that have an unadjusted p-value  $\leq 0.025321$ .  
Rom's procedure rejects those hypotheses that have an unadjusted p-value  $\leq 0.016667$ .

### 3 Adjusted P-Values (Quade)

Adjusted P-values obtained through the application of the post hoc methods (Quade).

i	algorithm	unadjusted $p$	$p_{Bonf}$	$p_{Holm}$	$p_{Hochberg}$	$p_{Hommel}$
1	MEABC	0.00034	0.000203	0.000203	0.000203	0.000203
2	ABCNG	0.001965	0.011791	0.009826	0.00978	0.007861
3	MAPSO	0.002445	0.01467	0.009826	0.00978	0.00978
4	ABCADE	0.016089	0.096534	0.048267	0.048267	0.048267
5	SHADE	0.043308	0.259849	0.086616	0.086616	0.086616
6	TAPSO	0.182135	1.09281	0.182135	0.182135	0.182135

Table 3: Adjusted  $p$ -values (QUADE) (I)

i	algorithm	unadjusted $p$	$p_{Holland}$	$p_{Rom}$
1	MEABC	0.00034	0.000203	0.000193
2	ABCNG	0.001965	0.009787	0.009325
3	MAPSO	0.002445	0.009787	0.009325
4	ABCADE	0.016089	0.047495	0.048267
5	SHADE	0.043308	0.084741	0.086616
6	TAPSO	0.182135	0.182135	0.182135

Table 4: Adjusted  $p$ -values (QUADE) (II)